FIG. 1

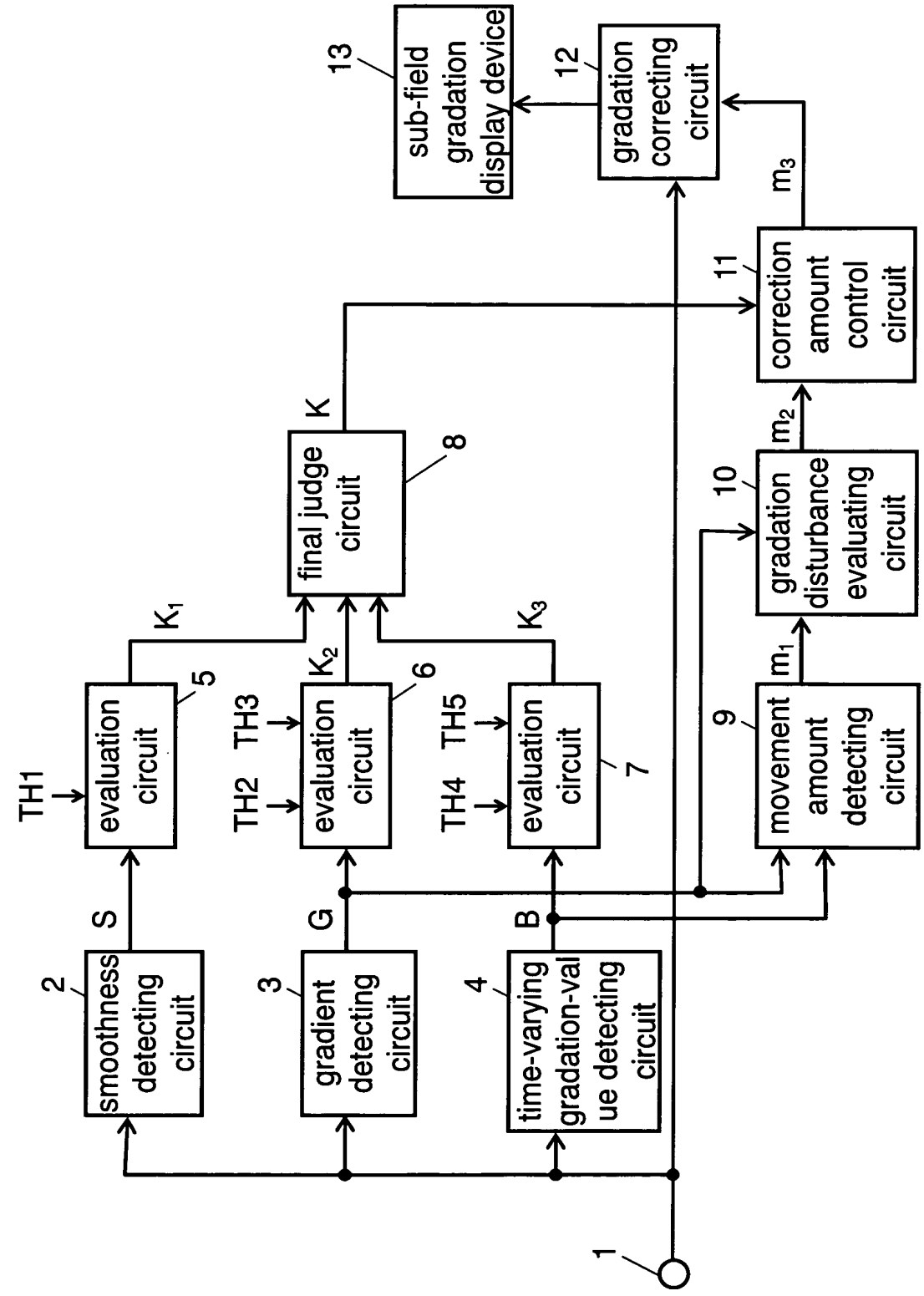

1
2
smoothness detecting circuit
3
gradient detecting circuit
4
time-varying gradation-value detecting circuit
5
evaluation circuit
6
evaluation circuit
7
evaluation circuit
8
final judge circuit
9
movement amount detecting circuit
10
gradation disturbance evaluating circuit
11
correction amount control circuit
12
gradation correcting circuit
13
sub-field gradation display device
S
G
B
K
K1
K2
K3
m1
m2
m3
TH1
TH2
TH3
TH4
TH5

FIG. 2

Smoothness (S)	×	×	×	×	S≥TH1	S<TH1
Gradient (G)	×	×	G<TH2	G>TH3	TH2≤G ≤TH3	×
Time-varying gradation values (B)	B<TH4	B>TH5	×	×	TH4≤B ≤TH5	×
Characteristics of areas	no change with time	drastic change with time	smooth area	edge area	constantly inclined area	complicate pattern
Correction level	correction : small	correction : small	correction : small	correction : small	correction : large	correction : small

FIG. 3

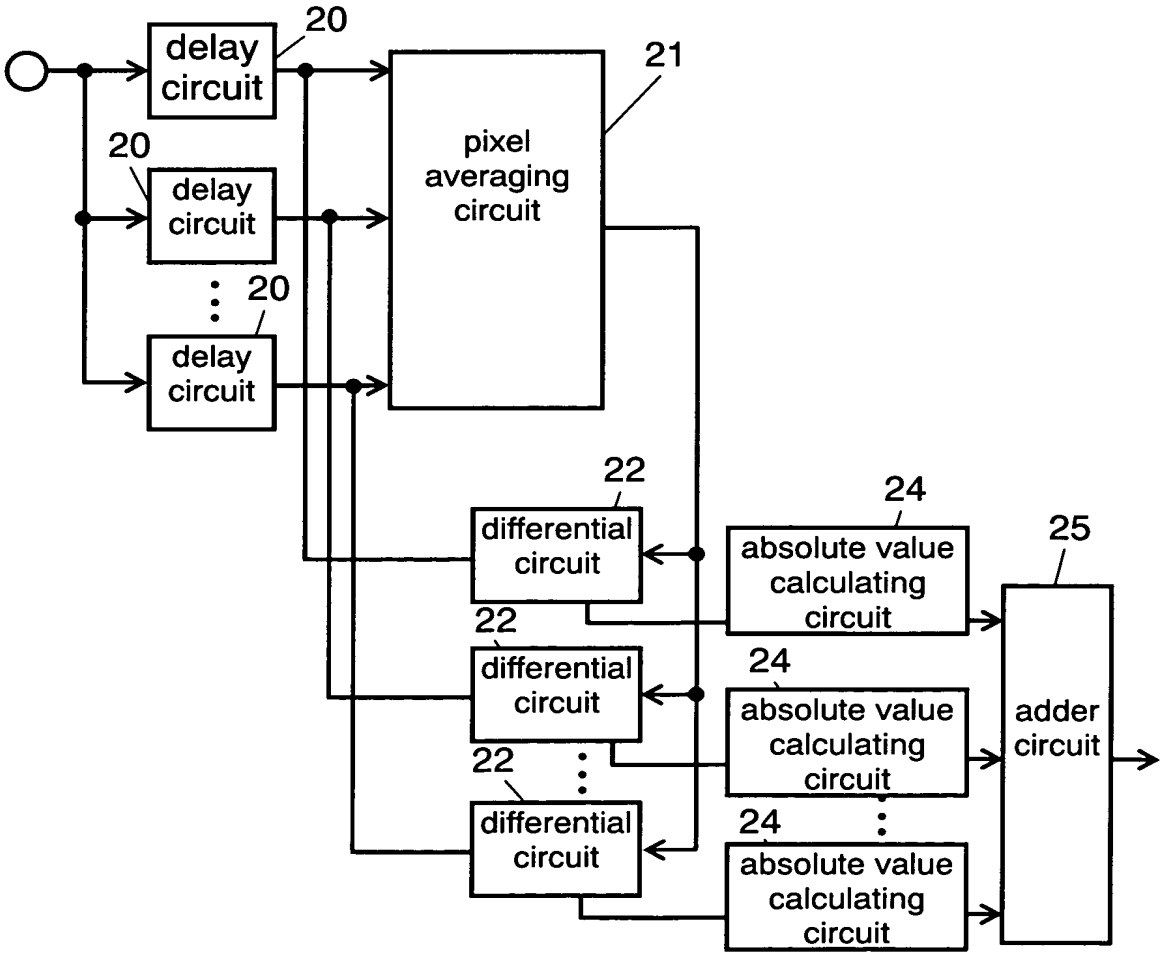


FIG. 4

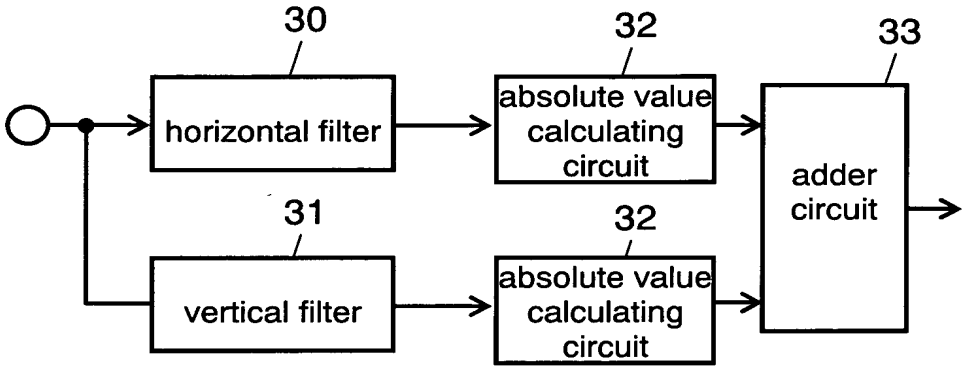


FIG. 5A

horizontal filter

1	0	-1
1	0	-1
1	0	-1

FIG. 5B

vertical filter

1	1	1
0	0	0
-1	-1	-1

FIG. 6

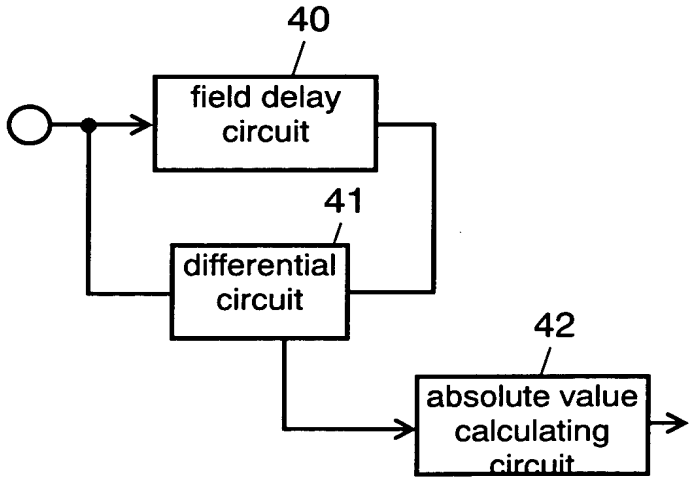


FIG. 7A

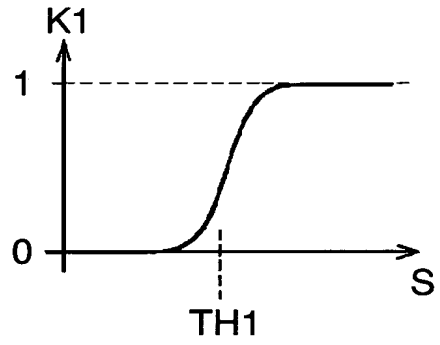


FIG. 7B

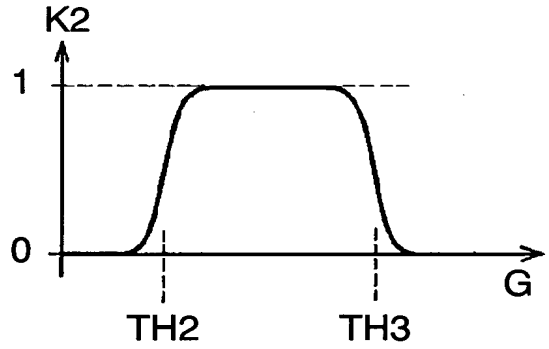


FIG. 7C

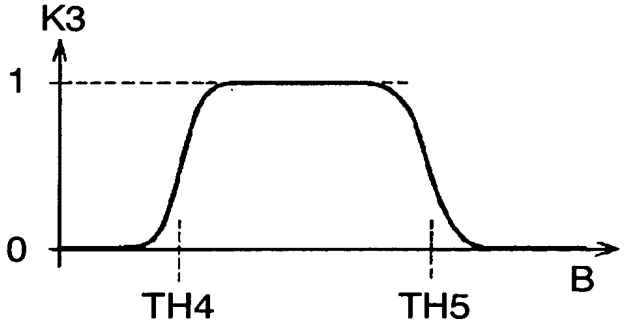


FIG. 8

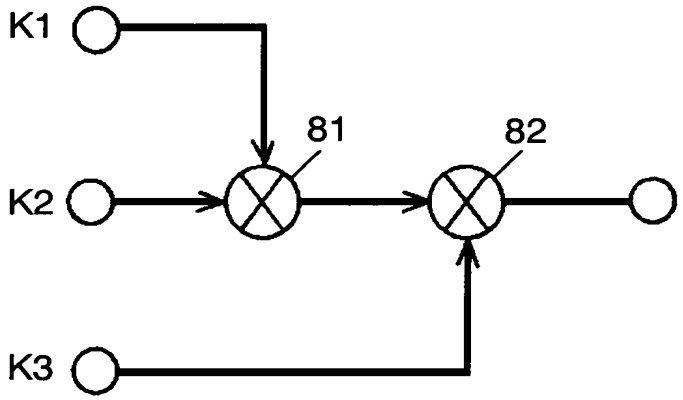


FIG. 9

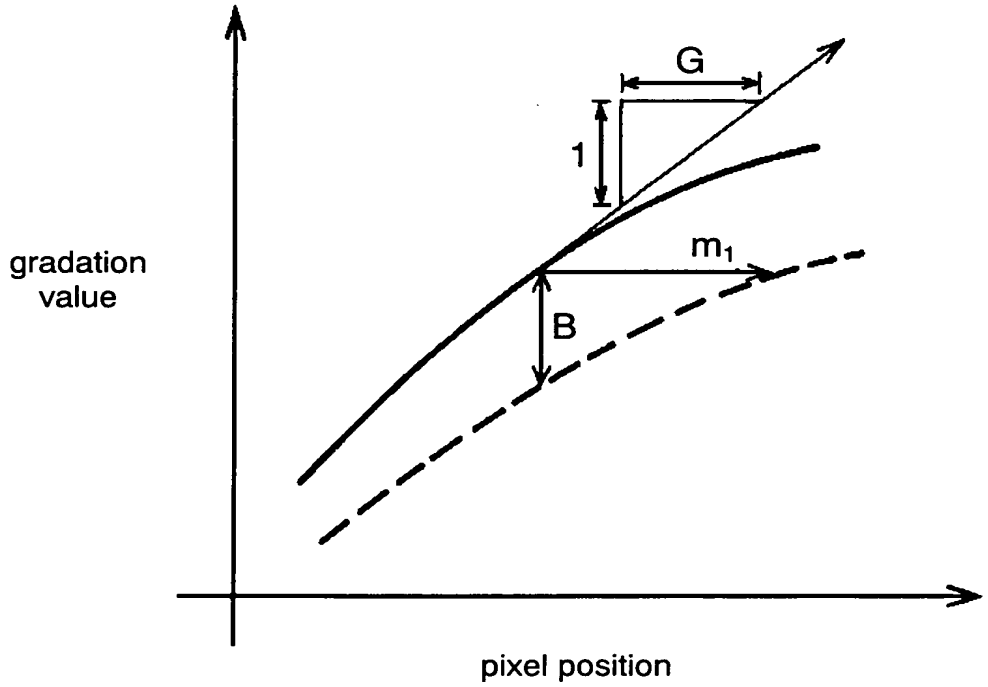


FIG. 10

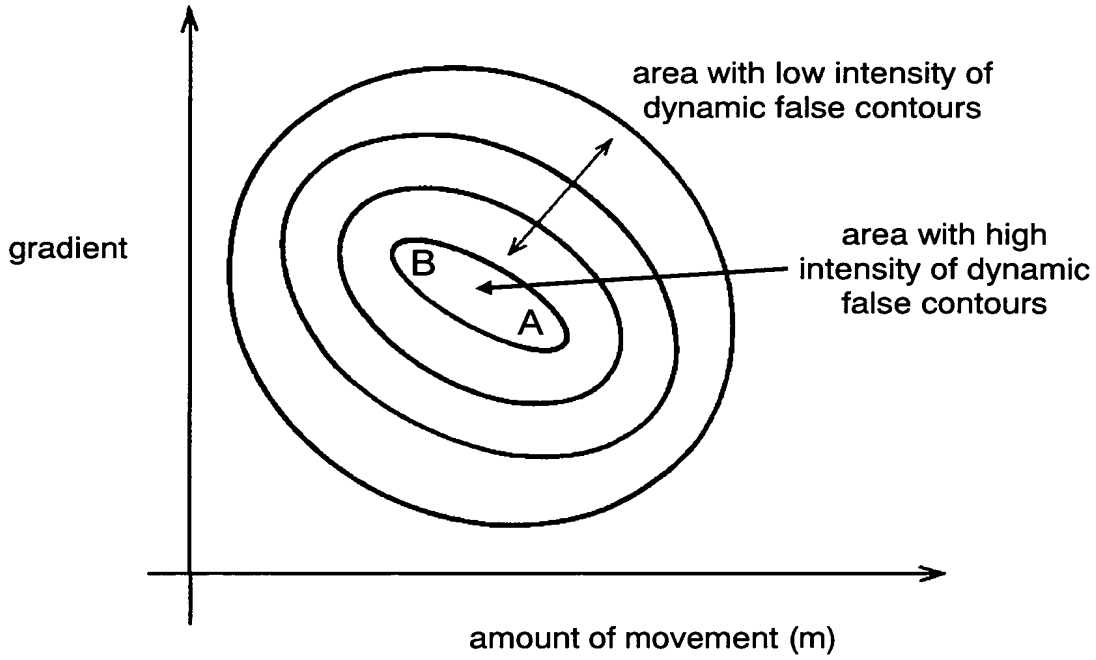

area with low intensity of dynamic false contours
gradient
area with high intensity of dynamic false contours
B
A
amount of movement (m)

FIG. 11

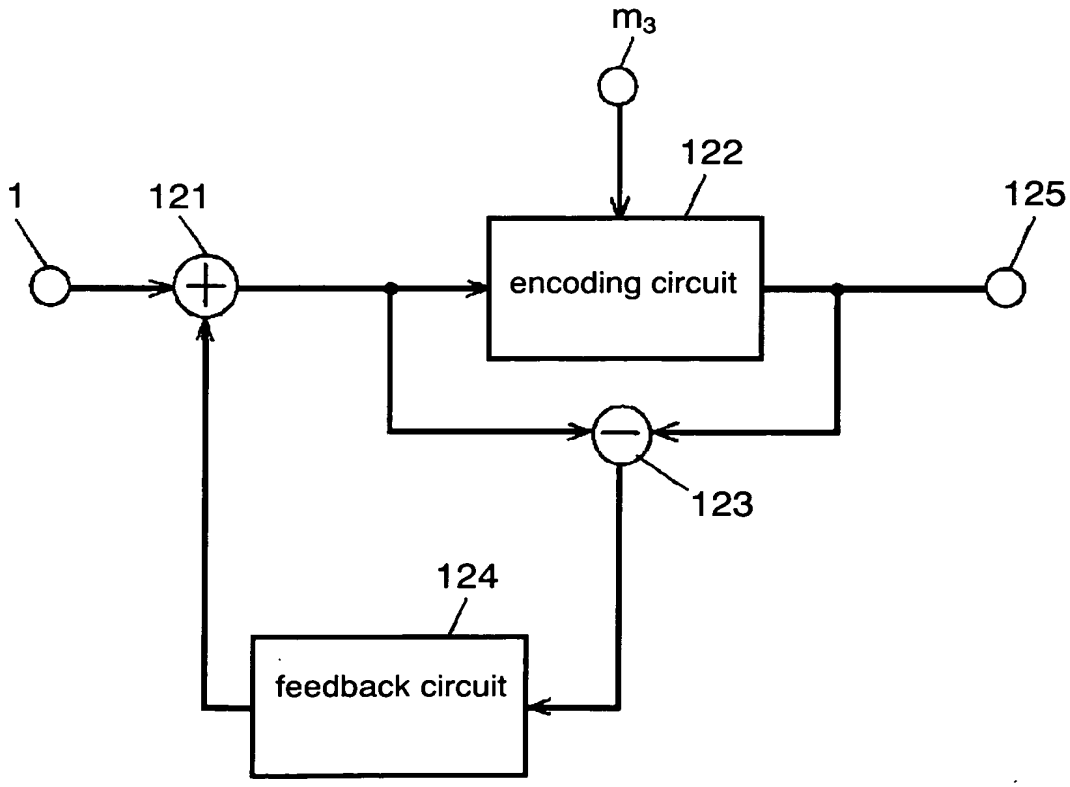

m3
122
1
121
125
encoding circuit
123
124
feedback circuit

FIG. 12

	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10
input gradation values	1	2	4	8	16	24	32	40	56	72
0~7	binary									
8~15				1						
16~23					1					
24~31				1	1					
32~39				1		1				
40~47					1	1				
48~55				1	1	1				
56~63				1	1		1			
64~71				1		1	1			
72~79					1	1	1			
80~87				1	1	1	1			
88~95				1	1	1		1		
96~103				1	1		1	1		
104~111				1		1	1	1		
112~119					1	1	1	1		
120~127				1	1	1	1	1		
128~135					1	1	1		1	
136~143				1	1	1	1		1	
144~151				1	1	1		1	1	
152~159				1	1		1	1	1	
160~167				1		1	1	1	1	
168~175					1	1	1	1	1	
176~183				1	1	1	1	1	1	
184~191					1	1	1	1		1
192~199				1	1	1	1	1		1
200~207					1	1	1		1	1
208~215				1	1	1	1		1	1
216~223				1	1	1		1	1	1
224~231				1	1		1	1	1	1
232~239				1		1	1	1	1	1
240~247					1	1	1	1	1	1
248~255				1	1	1	1	1	1	1

FIG. 13

	maximum gradation correction ↓ 7	6	5	4	3	2	1	minimum gradation correction ↓ 0
input gradation values	4	8	16	24	32	40	56	72
0~7	●	●	●	●	●	●	●	●
8~15	●	●	●	●	●	●	●	●
16~23		●	●	●	●	●	●	●
24~31	●	●	●	●	●	●	●	●
32~39			●	●	●	●	●	●
40~47		●	●	●	●	●	●	●
48~55	●	●	●	●	●	●	●	●
56~63				●	●	●	●	●
64~71			●	●	●	●	●	●
72~79		●	●	●	●	●	●	●
80~87	●	●	●	●	●	●	●	●
88~95					●	●	●	●
96~103				●	●	●	●	●
104~111			●	●	●	●	●	●
112~119		●	●	●	●	●	●	●
120~127	●	●	●	●	●	●	●	●
128~135							●	●
136~143						●	●	●
144~151					●	●	●	●
152~159				●	●	●	●	●
160~167			●	●	●	●	●	●
168~175		●	●	●	●	●	●	●
176~183	●	●	●	●	●	●	●	●
184~191								●
192~199							●	●
200~207							●	●
208~215						●	●	●
216~223					●	●	●	●
224~231				●	●	●	●	●
232~239			●	●	●	●	●	●
240~247		●	●	●	●	●	●	●
248~255	●	●	●	●	●	●	●	●

FIG. 14

	SF1								SF10	
input gradation values	1	2	4	8	16	24	32	40	56	72
0~7										
8~15				1						
16~23					1					
24~31				1	1					
32~39				1		1				
40~47					1	1				
48~55				1	1	1				
56~63				1	1		1			
64~71				1		1	1			
72~79					1	1	1			
80~87				1	1	1	1			
88~95				1	1	1		1		
96~103				1	1		1	1		
104~111	binary			1		1	1	1		
112~119					1	1	1	1		
120~127				1	1	1	1	1		
128~135					1	1	1		1	
136~143				1	1	1	1		1	
144~151				1	1	1		1	1	
152~159				1	1		1	1	1	
160~167				1		1	1	1	1	
168~175					1	1	1	1	1	
176~183				1	1	1	1	1	1	
184~191					1	1	1	1		1
192~199				1	1	1	1	1		1
200~207					1	1	1		1	1
208~215				1	1	1	1		1	1
216~223				1	1	1		1	1	1
224~231				1	1		1	1	1	1
232~239				1		1	1	1	1	1
240~247					1	1	1	1	1	1
248~255				1	1	1	1	1	1	1

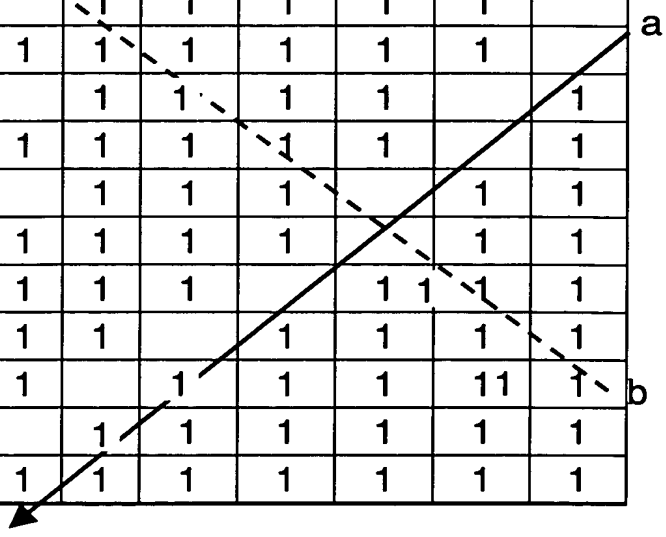


FIG. 15

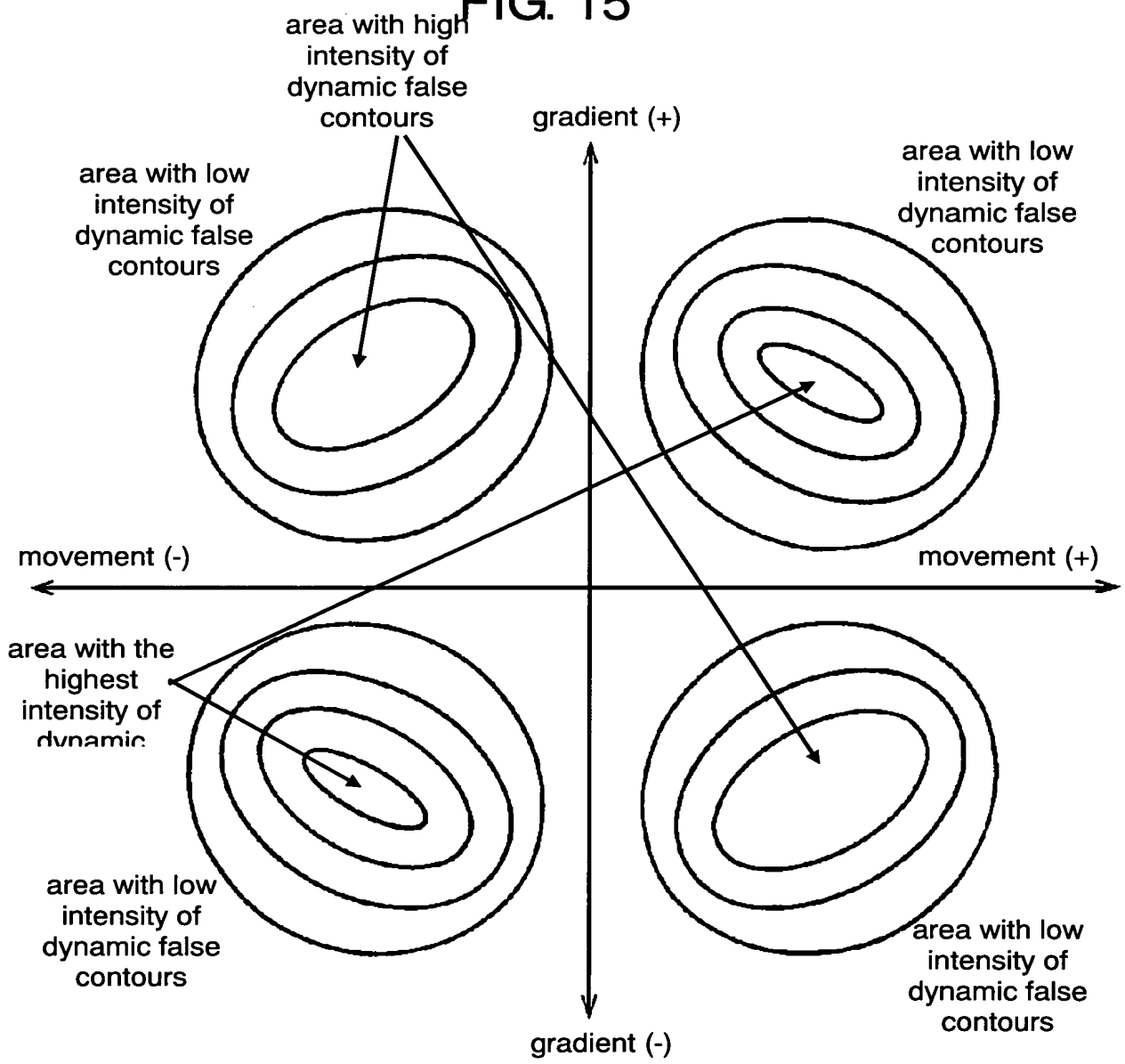

area with high intensity of dynamic false contours
gradient (+)
area with low intensity of dynamic false contours
area with low intensity of dynamic false contours
movement (-)
movement (+)
area with the highest intensity of dynamic
area with low intensity of dynamic false contours
area with low intensity of dynamic false contours
gradient (-)

FIG. 16

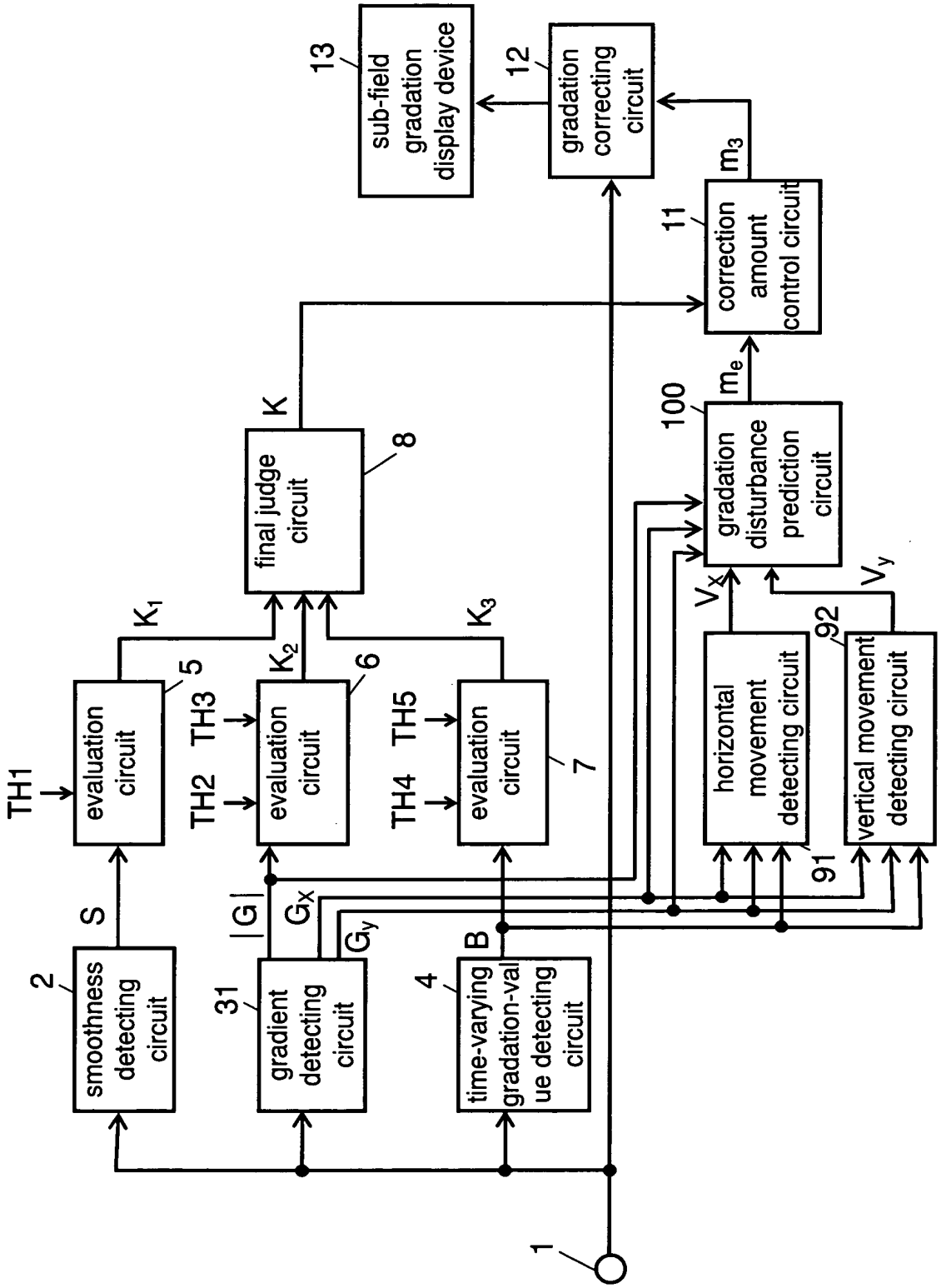

1
2
smoothness detecting circuit
S
31
gradient detecting circuit
|G|
Gx
Gy
4
time-varying gradation-value detecting circuit
B
TH1
evaluation circuit
5
K1
TH2
TH3
evaluation circuit
6
K2
TH4
TH5
evaluation circuit
7
K3
final judge circuit
8
K
horizontal movement detecting circuit
91
vertical movement detecting circuit
92
Vx
Vy
100
gradation disturbance prediction circuit
me
11
correction amount control circuit
m3
12
gradation correcting circuit
13
sub-field gradation display device

FIG. 17

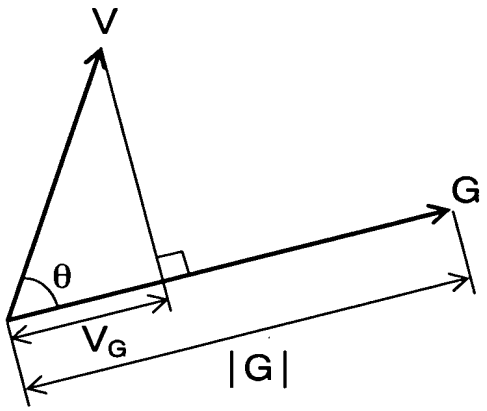

V
G
θ
V_G
|G|

FIG. 18

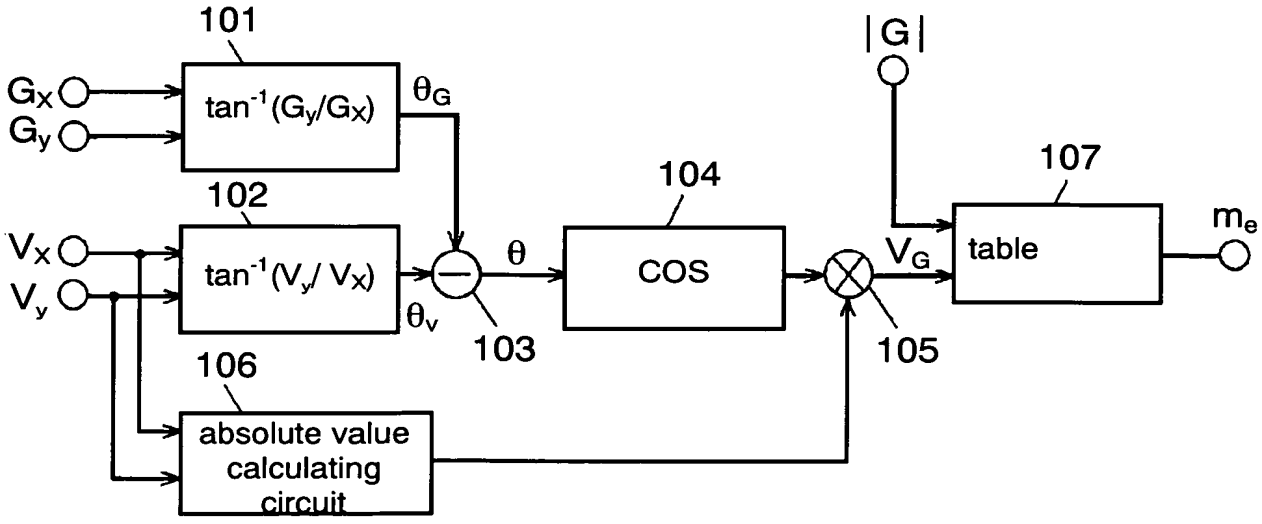

101
G_X
G_y
$\tan^{-1}(G_y/G_X)$
θ_G
102
V_X
V_y
$\tan^{-1}(V_y/V_X)$
θ_v
θ
103
104
COS
|G|
107
table
m_e
V_G
105
106
absolute value calculating circuit

FIG. 19

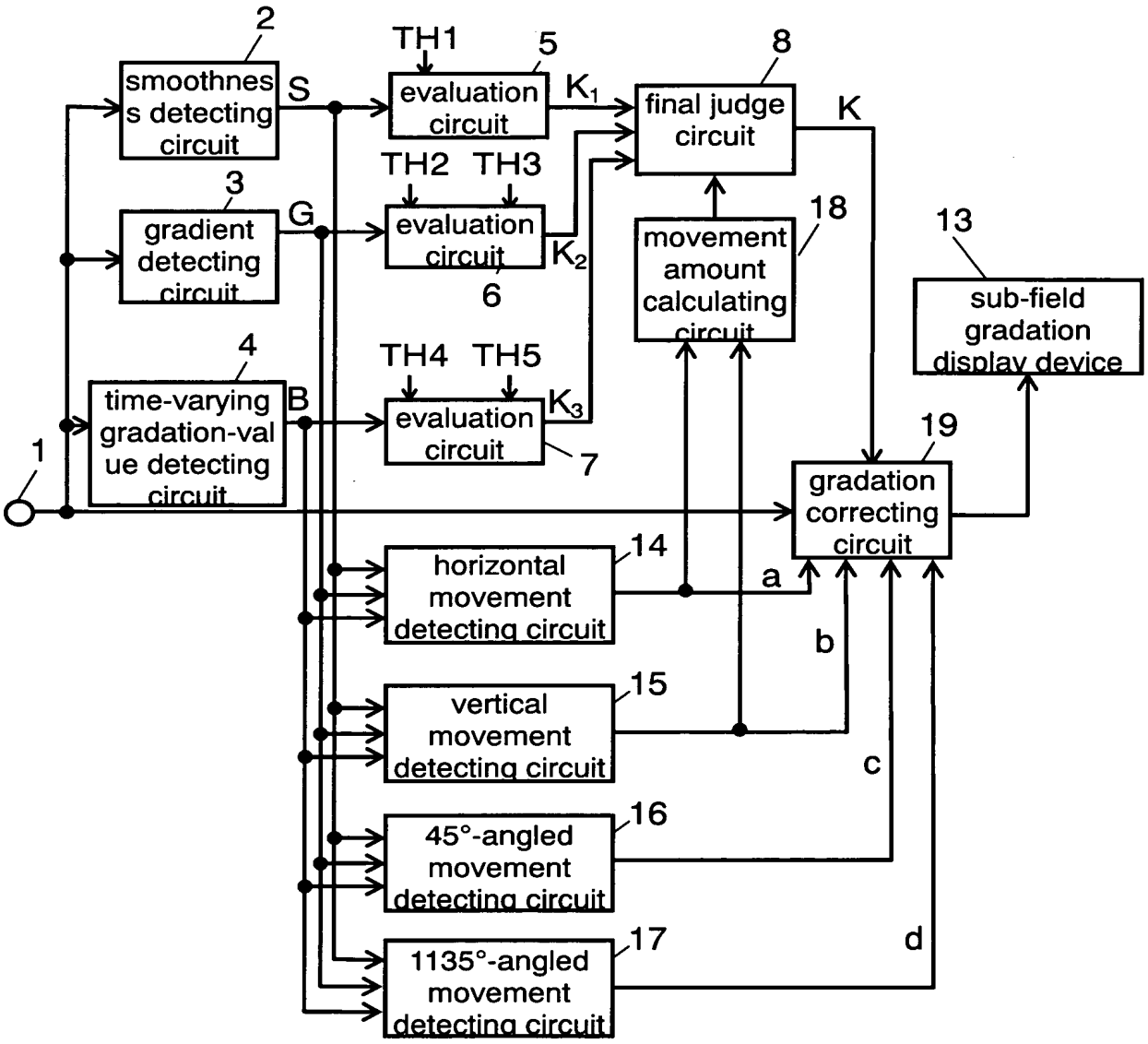

2
smoothness detecting circuit
S
TH1
5
evaluation circuit
K1
8
final judge circuit
K
3
gradient detecting circuit
G
TH2 TH3
evaluation circuit
K2
6
18
movement amount calculating circuit
13
sub-field gradation display device
4
time-varying gradation-value detecting circuit
B
TH4 TH5
evaluation circuit
K3
7
1
19
gradation correcting circuit
14
horizontal movement detecting circuit
a
b
15
vertical movement detecting circuit
c
16
45°-angled movement detecting circuit
17
1135°-angled movement detecting circuit
d

FIG. 20

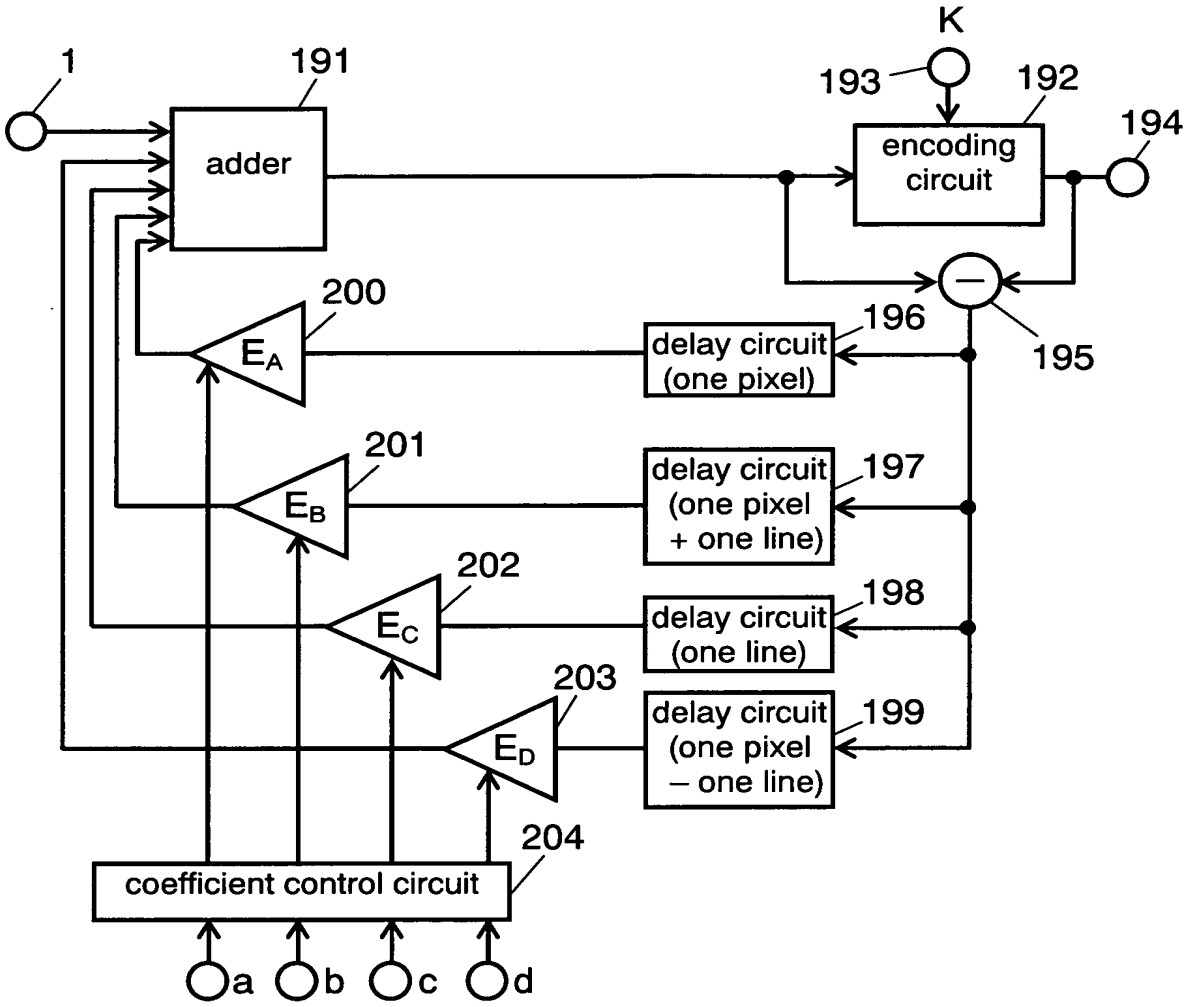

1
191
adder
K
193
192
encoding circuit
194
200
E_A
delay circuit (one pixel)
196
195
201
E_B
delay circuit (one pixel + one line)
197
202
E_C
delay circuit (one line)
198
203
E_D
delay circuit (one pixel – one line)
199
204
coefficient control circuit
a
b
c
d

FIG. 21

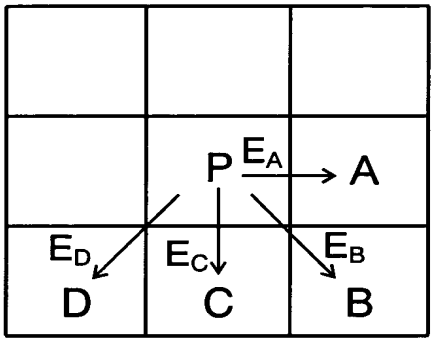


FIG. 22

	E_A	E_B	E_C	E_D
θ still picture	7	1	5	3
180° 0° ⇄	10	3	0	3
225° 45° ↖↘	3	10	3	0
270° 90° ↑↓	0	3	10	3
315° 135° ↗↙	3	0	3	10

FIG. 23

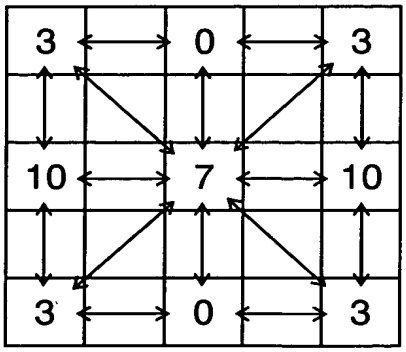


FIG. 24

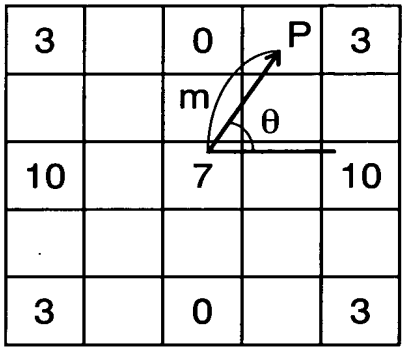


FIG. 25

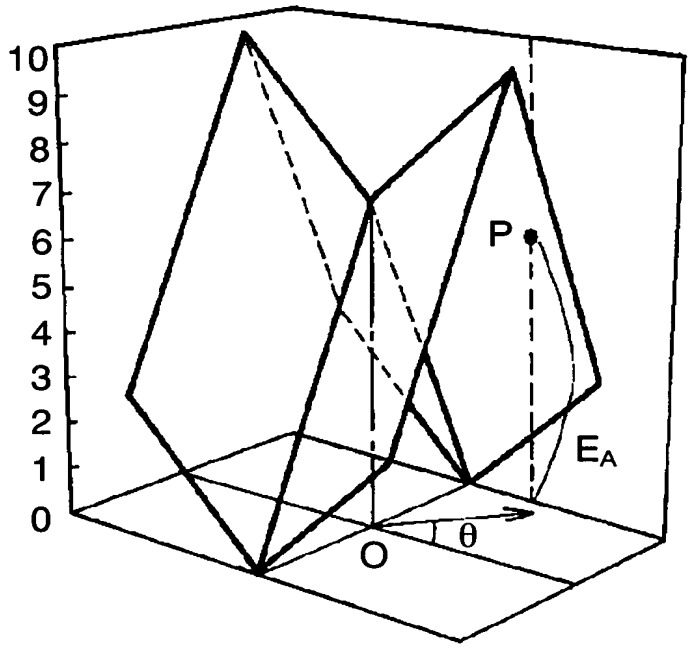


FIG. 26

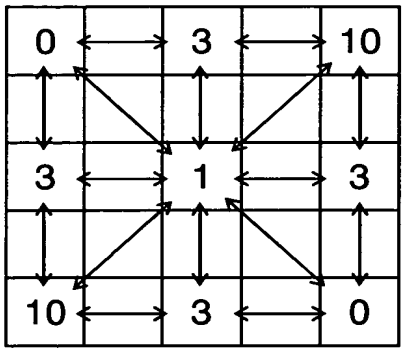


FIG. 27

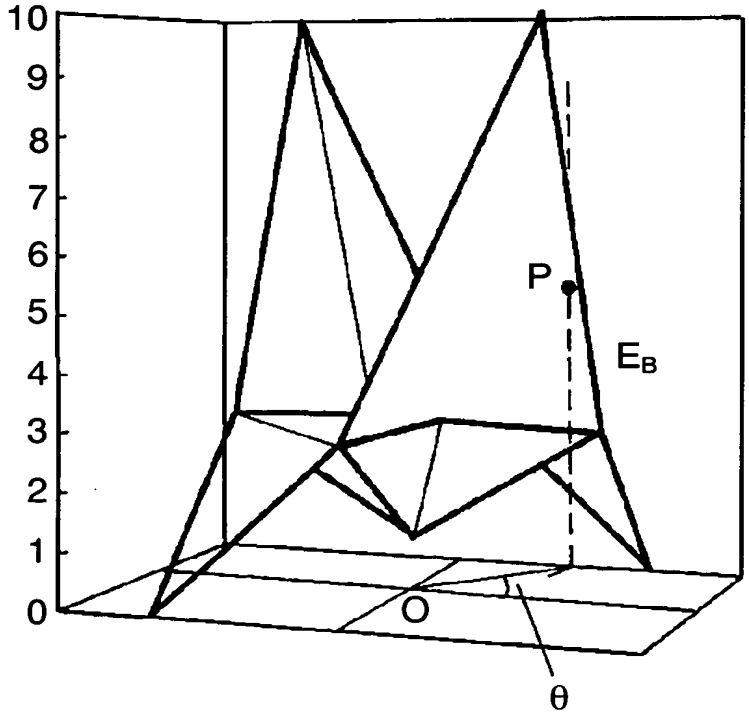


FIG. 28

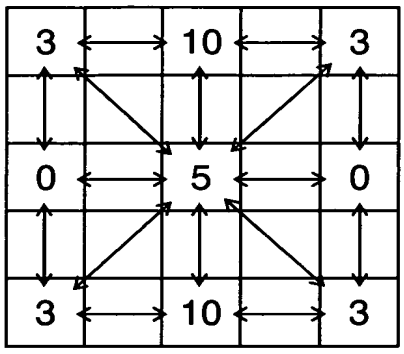
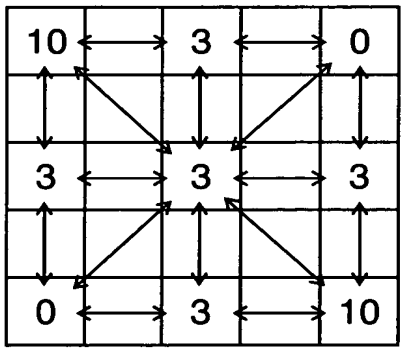


FIG. 29



Reference numerals in the drawings

1: input terminal
2: smoothness detecting circuit
3: gradient detecting circuit
4: time-varying gradation-value detecting circuit
5, 6, 7: evaluation circuit
8: final judge circuit
9: movement amount detecting circuit
10: gradation disturbance evaluating circuit
11: correction amount control circuit
12, 19: gradation correcting circuit
13: sub-field gradation display device
14: horizontal movement detecting circuit
15: vertical movement detecting circuit
16: 45°-angled movement detecting circuit
17: 135°-angled movement detecting circuit
18: movement amount calculating circuit
91: horizontal movement detecting circuit
92: vertical movement detecting circuit
100: gradation disturbance prediction circuit